

ser. 2, vi. p. 19) to the Hartebeest of South Africa (*Bubalis caama*), but that it was evident, from the shape of the horns and colour of the hairs, that this specimen also belonged to *B. swaynei*.

In reference to some remarks that had been made upon his usage of "*Bubalis*" instead of "*Alcelaphus*" for this group of Antelopes, Mr. Sclater pointed out that "*Bubalis*" of Lichtenstein was proposed in 1814 (Mag. d. Gesellsch. nat. Fr. vi. p. 152), two years before "*Alcelaphus*" of Blainville, and had been constantly used by Sundevall, Peters, and other writers, so that it had undoubtedly good claims to priority.

A note was read from Professor Jeffrey Bell regarding the habitat of *Bipalium kewense*. This interesting Planarian, first found in Kew Gardens, had been observed in very various parts of the world. In only one case, however, did the circumstances of its discovery make it possible that the worm was indigenous to the place where it was met with. That one place was Samoa, where Mr. J. J. Lister found it under stones in the bush. Mr. Fletcher, in communicating this fact to the Linnean Society of New South Wales (see Zool. Anzeig. 1891, p. 139), had expressed the opinion that there was little ground for supposing that the species was indigenous in Samoa. Further reason, however, for supposing that Samoa may be one of the places in which the worm is indigenous was to be found in the fact that Mr. R. B. Leefe had recently collected the same worm in Tongatabu. Prof. Bell had learnt from the Director of the Royal Gardens, Kew, that though no plants had, to the Director's knowledge, been received directly from Tongatabu, exchanges had been made with Fiji. It might be urged that the probability of the group of islands just named being the original home of the species was, on the whole, increased by the facts now stated.

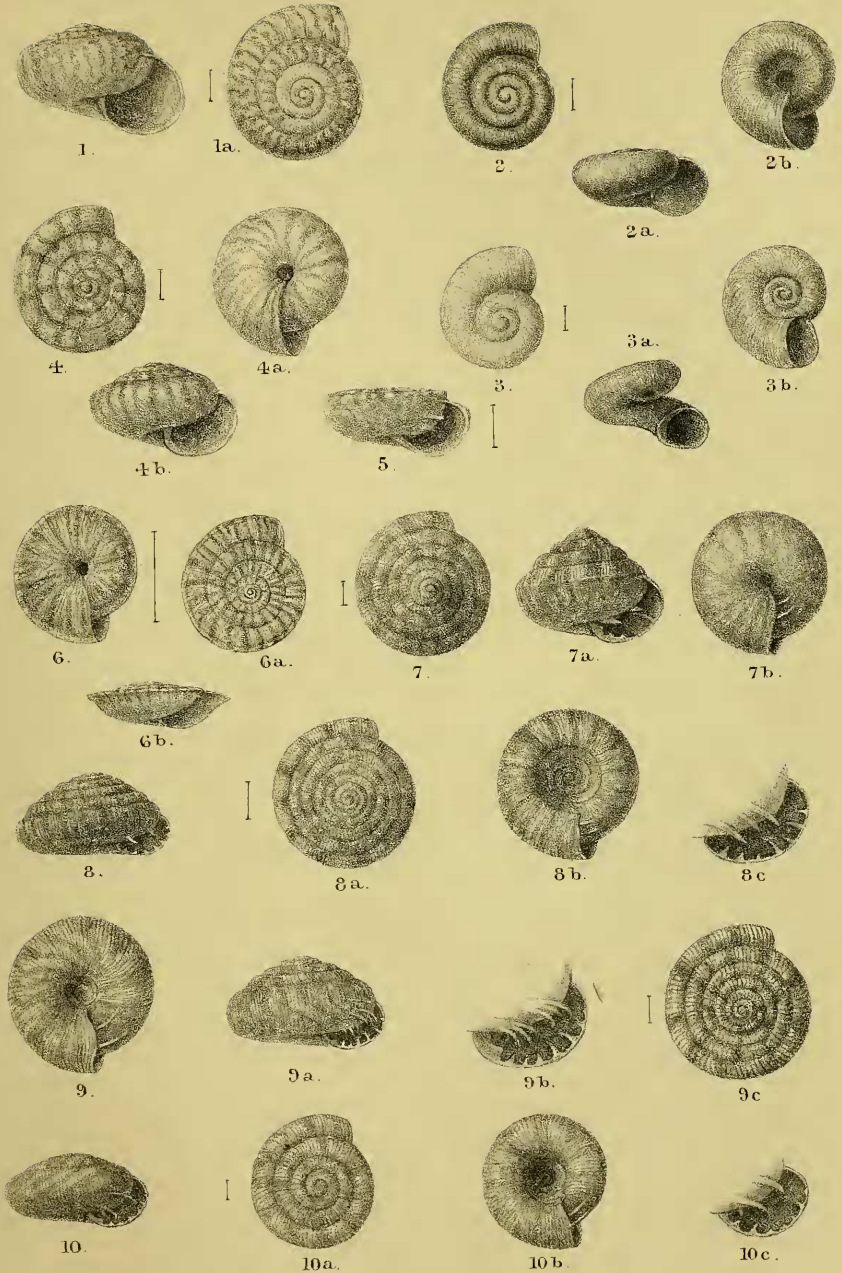
The following papers were read :—

1. On the Land-Shells of St. Helena. By EDGAR A. SMITH.

(Plates XXI. & XXII.)

[Received March 2, 1892.]

Last year I had the honour of presenting to the Society an account of the marine Mollusca of St. Helena. I now propose to introduce to its notice some remarks upon the terrestrial fauna of that island. Like the former, the present report is based chiefly upon collections made by Capt. W. H. Turton, R.E., and presented to the British Museum. The collection is the most complete that has ever been made, and contains examples not only of most of the known species, but also of as many as eleven undescribed forms, a proportion of more than one third of the entire fauna. Our best thanks are due to Capt. Turton for the labour of getting together such an interesting





13.



13a.



11.



16.



21.



15.



12.



20.



20a.



14.



17.



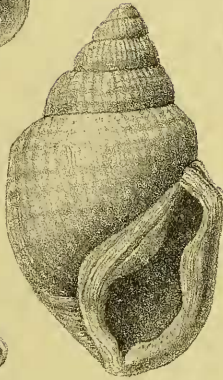
17a.



18.



19.



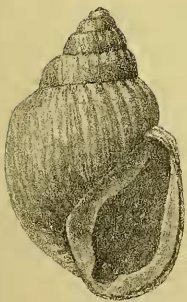
11a.



19a.



19b.



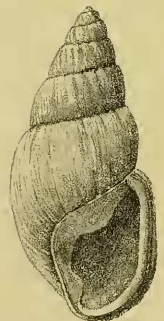
11b.



11c.



11d.



11e.

collection, and for the careful notes regarding localities which accompany the specimens.

The most complete account of the terrestrial fauna¹ of St. Helena hitherto published is that given by Mr. Wollaston in his work 'Testacea Atlantica,' published in 1878. He there enumerates 29 species of Land-Shells, of which 9 at least must be regarded as introductions since the discovery of the island 390 years ago. Some of these species—for example, *Limax gagates*, *Vitrea cellaria*, *V. alliaria*, *Helix pulchella*, *H. aspersa*, and *Pupa umbilicata* (= *helenensis*, Pfr.)—were doubtless introduced along with European shrubs and plants. *Patula pusilla* probably was imported from Madeira, the Canary Islands, or the Azores, where it is very abundant; and the two remaining species, *Stenogyra compressilabris* and *Acicula veru*, upon which some remarks will be made at the end of this paper, are evidently West-Indian forms. With regard to the twenty indigenous species mentioned by Mr. Wollaston, some, in my opinion, are merely varieties and not specifically distinct. After a careful study of all the forms, including the eleven new species now described, the total number of indigenous species may be estimated at twenty-seven. Of these, seven are living on the island at the present time, eighteen have become extinct since the destruction of the primæval forests, and two are found both recent and semi-fossil.

A great deal has been written upon the relationship of the fauna of St. Helena with regard to other parts of the globe, and an interesting *résumé* of this subject is given by Mr. Wallace in his work 'Island Life,' pp. 281–297.

Professor Forbes many years ago, from a study of the Mollusca, hazarded the theory of a possible ancient connection of St. Helena with South America. This view, however, was vigorously rejected by Wollaston, Jeffreys, and others, and, considering the present isolated position of the island, the actual enormous depth of the surrounding ocean, and other cogent reasons², this theory certainly does appear unsupportable. There is, however, a greater resemblance between the shell-fauna of the two localities than was recognized either by Forbes or Wollaston; and the occurrence of a species, discovered since they investigated this subject, and more resembling a group (*Tomigerus*) which is exclusively Brazilian in distribution than any other, together with the reasons which influenced Forbes, would seem to indicate that country as the probable source whence some of the indigenous but now extinct species, or their ancestors, originated. How they were transmitted is a hopeless problem to solve, and although drift-wood, carried by oceanic currents, is doubtless answerable for a good deal in the way of distribution, the subject must apparently ever remain one of mere speculation. It has been stated by Mr. Wollaston that the large *Bulimus aurisvulpina* is represented in the Solomon Islands and New Zealand by

¹ No freshwater forms have as yet been discovered.

² Neither the flora of St. Helena nor the insect-fauna suggests particularly a South-American relationship or origin.

species which have much the same type of form ; but this supposed resemblance, in reality, proves to be less, on a careful comparison of the two types, than one at first would imagine. Perhaps the most striking similarity to Pacific forms occurs among the *Patulae*. Such species as *P. radiella*, Pfr., *P. multilamellata*, Garret, *P. acuticostata*, Mousson, and others from the Polynesian Archipelago are exact representatives of the *Endodontæ*, or toothed group of *Patulae*, from St. Helena. Still, although these Pacific forms are certainly of the same type, we must also remember that the same form of *Patula* occurs in the island of Fernando Noronha, namely, *P. quinquelirata*, Smith, and possibly also on the adjacent mainland of Brazil itself, although its presence there has yet to be discovered.

In the following complete list of the *indigenous* species references are not given, as they are obtainable by consulting Mr. Wollaston's work. In conclusion I propose to discuss one or two of the introduced species.

A. *Indigenous Species.*

1. VITREA MELLISSII (Wollaston).

This minute species, which is known to me only by description, is possibly an introduction.

PATULA (without teeth).

2. PATULA SPURCA (Sowerby). (Plate XXI. figs. 1, 1 a.)

This species was unknown to Mr. Wollaston, and consequently being misled by the somewhat poor figure given by Forbes, he has placed it in the genus *Hyalina* (= *Vitrea*). The examination, however, of a number of specimens, some received from Mr. Alexander, who furnished Forbes with his examples, others from Capt. Turton, proves that it should be located in the group *Patula*. Sowerby's description being so brief, I think it advisable to recharacterize it, thus :—

Testa anguste umbilicata, suborbicularis, tenuis, albida, rufo-variegata, haud nitida ; spira parum elevata, ad apicem obtusa ; anfractus 5, convexiusculi, regulariter et lente accrescentes, lineis incrementis tenuibus confertis flexuosis obliquis striati, ultimus ad peripheriam rotundatus, antice haud descendens ; apertura late lunata, simplex, haud dentata vel lirata ; peristoma tenue, margine columellari leviter expanso et reflexo.

Diam. maj. 5 millim., min. 4½, alt. 3¾ ; apertura 2¼ longa, 1⅔ lata.

Hab. Sugarloaf Hill and Quarry (Turton). Extinct (? living).

In some specimens the spire is more elevated than in others, and occasionally the apex is scarcely raised above the last whorl. The majority of the examples examined have to a great extent lost their original colour and are now of a uniform whitish tint ; but a few from Sugarloaf Ridge, which have the appearance of live shells, look of a pale reddish colour to the naked eye, but when viewed under a

lens it is seen that they are variegated with irregular radiating blotches of red and white intermingled. The lines of growth are distinct, finely hair-like, arcuate and oblique on the upper surface, and gently undulating on the body-whorl. The umbilicus is deep but narrow, equalling about one fifth the diameter of the base.

3. *PATULA DIANÆ* (Pfeiffer). (Plate XXI. figs. 2-2 b.)

This species does not belong to the group *Hyalina* (= *Vitrea*), as supposed by Wollaston, but falls naturally into *Patula* together with the preceding species, which it very closely resembles.

Hab. Diana's Peak. Living (*Pfr.*).

4. *PATULA PERSOLUTA*, sp. nov. (Plate XXI. figs. 3-3 b.)

Testa minuta, late et aperte umbilicata, discoidalis, planorbiformis, pallide rufescens (?); *anfractus* $3\frac{1}{2}$, *perconvexi, sutura profundissime discreti, subceleriter accrescentes, lineis incrementi obliquis striati, ultimus tubiformis, rotundatus, antice solutus et descendens; apertura subcircularis, margine columellari leviter planato.*

Diam. maj. $3\frac{1}{2}$ millim., *min.* $2\frac{3}{4}$, *alt.* 2.

Hab. Side Path (*Turton*). Extinct.

This is a very remarkable little species, at once recognizable by its Planorbiform appearance, and the detached anterior portion of the body-whorl. The upper whorls do not rise above the last, and the suture is remarkably deep. The umbilicus is very wide and open, permitting the convolution of the whorls to be observed to the apex. Both of the specimens examined exhibited traces of red towards the apex, and there is every probability of the living shell having exhibited more or less of that tint.

5. *PATULA LÆTISSIMA*, sp. nov. (Plate XXI. figs. 4-4 b.)

Testa minuta, anguste umbilicata, depresso subconoidea, alba, maculis radiantibus rufis supra et infra picta; anfractus $5\frac{1}{2}$, *lente accrescentes, superne convexiusculi, sutura subprofunda sejuncti, lineis incrementi fortibus striati, ultimus ad peripheriam rotundatus, antice haud descendens; apertura semilunata, edentula; peristoma tenue, simplex, margine columellari dilatato; umbilicus profundus, angustus, diam. totius* $\frac{1}{3}$ *adæquans.*

Diam. maj. 4 millim., *min.* $3\frac{1}{2}$, *alt.* $2\frac{1}{3}$.

Hab. Sugarloaf Ridge, near the top (*Turton*). Extinct.

This little species is remarkable for its small deep umbilicus, the toothless aperture, rather well-marked lines of growth, the rounded periphery to the body-whorl, and the red colour-markings. These consist of radiating blotches on the upper surface of the whorls, which become rather angular and wavy on the middle and lower part of the body-whorl.

PATULA (with teeth, *Endodonta*).

6. PATULA BIPLICATA (Sowerby).

Hab. North of the island. Extinct.

A small species with two palatal folds. Unknown to me.

7. PATULA BILAMELLATA (Sowerby). (Plate XXI. fig. 5.)

Var. UNILAMELLATA. Aperture with the lower parietal lamella wanting.

Hab. Sugarloaf Ridge, rare (*Turton*). Extinct.

This name was also applied by Pfeiffer to a small species of "*Helix*" in 1845, or one year after the publication of Sowerby's description. As it cannot be regarded as generically distinct, although very different in form, I propose to substitute the name *Patula pagodiformis*.

8. PATULA VERNONI, sp. nov. (Plate XXI. figs. 6-6 b.)

Testa anguste perforata, depresso discoidea, superne planata, ad peripheriam acute carinata, alba, superne et infra rufo radiata; anfractus 6, lente accrescentes, vix convexiusculi, lineis incrementi tenuibus striati, ultimus acute carinatus, supra et infra carinam leviter compressus, antice haud descendens, lineis radiantibus rufis undulatis infra pictus, radiatim tenuiter striatus; apertura parva, subrhomboidalis, lira parietali tenui intrante munita; peristoma simplex, tenue, umbilicum versus leviter incrassatum.

Diam. maj. 12 millim., *min.* 11, *alt.* 4.

Hab. Side Path (*Turton*). Extinct.

This species is at once recognized by its very flat spire, the compressed very acute keel, the minute umbilicus, the single fine lira-tion upon the upper part of the body-whorl, running within the aperture, and the style of colouring. The red rays upon both the upper and lower surfaces are more or less wavy and interrupted. There is no other sculpture excepting the fine lines of growth which cross the upper surface of the whorls obliquely and are a little flexuous beneath. The body-whorl has a more distinct impression below the keel than above it. I have much pleasure in naming this very distinct species after my late friend T. Vernon Wollaston, whose work '*Testacea Atlantica*' is one of the most accurate and complete hitherto published upon any Molluscan fauna.

9. PATULA PSEUSTES, sp. nov.¹ (Plate XXI. figs. 7-7 b.)

Testa conoidea, pyramidalis, anguste umbilicata, albida, superne maculis quadratis, inferne flammulis rufis picta; anfractus 6½, convexi, sutura profunda discreti, radiatim tenuiter costulati, ultimus ad peripheriam rotundatus, inferne striis tenuissimis flexuosis sculptus; apertura lunata, obliqua, intus denticulis inæqualibus sex (duobus lamelliformibus parietalibus prominentibus, tribus minimis supra columellam, una

¹ ψεύστης, a deceiver.

tenui prominenti in medio palati) instructa; peristoma tenue, marginibus remotis, columellari leviter dilatato.

Longit. $2\frac{2}{3}$ millim., *diam.* $3\frac{1}{3}$; *apertura* $1\frac{1}{3}$ longa, $\frac{1}{2}$ lata.

Hab. Flagstaff Hill (*E. W. Alexander*). Extinct.

This species has the spire more elevated and conical than the other species of *Patula* from the island. *P. cutteri*, Pfr., may approach it somewhat, but that species is said to have only two parietal lamellæ, and two basal denticles near the columella. The present species has an additional basal denticle, and a prominent thin palatal lamella, which falls as it were between the two on the inner or parietal side of the aperture.

10. PATULA CUTTERI (Pfeiffer).

Hab. Diana's Peak. Living (*Pfr.*).

A small species, unknown to me, apparently similar in general features to the preceding, but with only four teeth within the aperture, two parietal and two basal near the columella, more narrowly umbilicated and probably more strongly sculptured.

11. PATULA POLYODON (Sowerby). (Plate XXI. figs. 8-8 c.)

This is the most widely umbilicated of all the species of *Patula* from St. Helena, and this feature alone is sufficient to distinguish it from the rest. The whorls also, in adult shells eight to nine in number, enlarge very slowly. The striæ are fine, regular, arcuately oblique above, and slightly wavy on the last whorl. There are *three parietal liræ* extending far within the aperture, of which the upper and lower are nearly always double. The plicæ within the outer lip are almost invariably (in adult shells) seven in number, subequidistant, but not of equal thickness, two or three towards the columella being stouter than the rest, which are slender and extend some distance within.

Diam. maj. $5\frac{1}{4}$ mill., *min.* 5, *alt.* $2\frac{1}{2}$.

Hab. Side Path, Sugarloaf Quarry, Sugarloaf Ridge (*Turton*). Extinct.

The species to which the foregoing remarks apply is certainly the *Helix alexandri* of Forbes, for in the British Museum there are specimens of it presented by Mr. Alexander, who also furnished Forbes with the shells he described. Moreover the description is fairly applicable, especially that portion of it referring to the umbilicus, which is described as "*maximus*." It is much less certain that this is the *H. polyodon* of Sowerby, but as Mr. Wollaston has united these species as well as *H. helenensis* (Forbes), Pfeiffer, it will probably be advisable to acquiesce in this decision. There are, however, certain differences in the descriptions, which seem to indicate that more than one species was described by these authors, for instance:—*H. polyodon* is said to consist of six striated whorls, with three parietal and five palatal liræ, and a moderate-sized umbilicus, whereas *H. alexandri* is described as having seven strongly striated whorls, three parietal and eight palatal liræ, and a very large umbilicus. *H. helenensis* is characterized as possessing eight very

narrow closely costate whorls, and only two parietal liræ and the same number within the outer lip. Pfeiffer states that *H. helenensis* was described by Forbes in the Proc. Zool. Soc. for 1851, and this statement is copied both by Reeve and Wollaston. This appears to be an error, for after a careful search I have been unable to discover in any publication the description by Forbes of any species of *Helix* under that name.

12. *PATULA MINUTISSIMA*, sp. nov. (Plate XXI. figs. 9–9 c.)

Testa conoidea-depressa, mediocriter late umbilicata, albo et rufo maculata et variegata; spira leviter elevata, superne obtusa; anfractus 7, primi duo læves, pallide rufescentes, cæteri convexiusculi, lirulis tenuibus arcuatis obliquis, in anfr. ult. flexuosis, ornati, ultimus ad peripheriam acute rotundatus, vel interdum obsolete subangulatus, antice haud descendens; apertura oblique semilunata; lamellæ parietales tenuissimæ, in cochleis adultis sex, in exemplis juvenilibus quatuor vel quinque; plicæ palatales 8–10; peristoma tenue, margine columellari expanso.

Diam. maj. $4\frac{3}{4}$ millim., *min.* $4\frac{1}{2}$, *alt.* $2\frac{1}{4}$.

Hab. Sugarloaf Ridge (Turton). Extinct.

This species is smaller than *P. polyodon*, more narrowly umbilicated, has fewer whorls, coarser and more remote striæ, and a different armature within the aperture. In full-grown shells there are as many as six parietal liræ, as it were, in two groups of three. They are very fine and extend a long way within. The plicæ within the outer lip vary apparently from seven or eight to ten or eleven, and some of them are more prominent than others. The red markings take the form of radiating blotches on the upper surface, and more undulating or zigzag streaks beneath.

13. *PATULA LEPTALEA*, sp. nov.¹ (Plate XXI. figs. 10–10 c.)

Testa orbicularis, depressa, late umbilicata, albida rufo variegata; spira vix elevata; anfractus 5, primi $1\frac{1}{2}$ læves, cæteri convexiusculi, tenuissime arcuatim striati, lente accrescentes, ultimus ad peripheriam acute rotundatus, antice haud descendens; apertura oblique semi-lunata; lamellæ parietales tres (quarum suprema et mediana duplices sunt) tenues, longe intrantes; plicæ palatales circa sex.

Diam. maj. $3\frac{1}{4}$ millim., *min.* 3, *alt.* $1\frac{1}{3}$.

Hab. Sugarloaf Quarry (Turton). Extinct.

This species is much smaller than *P. polyodon* and not quite so large as *P. minutissima*; it is flatter than either, much more finely striated than the latter, and has a different oral armature from both. The parietal liræ are unequal in size, that nearest the columella being the smallest. The two others are about equal and double, and between occasionally a very small and slender intermediate lira is observable.

¹ λεπταλέος, delicate.

BULIMUS (PACHYOTUS).

14. BULIMUS AURIS-VULPINA (Chemnitz). (Plate XXII. figs. 11-11*d*.)

Hab. All along Sugarloaf Ridge (*Turton*). Extinct.

With regard to this, the largest extinct snail of St. Helena, Mr. Wollaston admits the resemblance "to a certain extent" to certain Brazilian species, at the same time observing "that much the same type of form exists equally in the Solomon Islands and New Zealand." Whilst agreeing with those remarks, I would point out that although in the Pacific shells referred to the apertures are somewhat similar, the general form, especially of the body-whorl, is much more elongate. On the contrary, *B. melanostoma* and *B. bilabiatus* from Brazil, cited by Forbes in comparison, exhibit not only like proportions, but also similar oral characters.

Captain Turton in his notes remarks: "The shape appears to me to vary immensely, and therefore I have sent as many as 30 specimens, so as to show all the intermediate forms. The very slender ones are, I suppose, *B. darwinianus*, but I can scarcely draw any line between them. I noticed that the different varieties of this shell generally (always, I think) came from different parts of the ridge; and you will observe that the more recent shells which retain their colour do not grow to the same size as the more fossilized ones."

I fully concur in the opinion arrived at by Captain Turton respecting *B. darwinianus* (Plate XXII. fig. 11*d*) being merely an elongate form of the *B. auris-vulpina*.

His other observation, with regard to the smaller size of the more recent specimens, is also very interesting. This diminution might be accounted for by the vegetation being less luxuriant and other conditions being less favourable to finer growth than in former times, before the partial destruction of the primæval forests which then clothed the island.

The freshest examples are of a light reddish colour and generally of a somewhat darker tint towards the apex. The top of the plications at the suture are whitish, and there is more or less of this colour variously distributed over the surface in the form of irregular streaks and blotches. A few subfossil snails' eggs obtained at Sugarloaf Ridge along with this species evidently from their size belong to it. They are roundly ovate, being $6\frac{1}{2}$ millim. in length and 6 broad. Some other much smaller eggs were also found by Captain Turton at the same place, but in this instance it would be mere guesswork to suggest to which species they belong.

(BULIMULUS.)

15. BULIMULUS BLOFELDI, Forbes. (Plate XXII. fig. 12.)

Hab. Side Path; very common (*Turton*).

This species is very like the following in form, but has not the same strong spiral sculpture. However in the best preserved example indications of transverse striæ and some oblique faint reddish markings are observable.

16. *BULIMULUS HELENA*, Quoy and Gaimard. (Plate XXII. figs. 13, 13 a.)

With this species I unite *B. fossilis*, of Sowerby, and *B. sealeianus* of Forbes (Pl. XXII. fig. 13 a). Typical specimens are of the same general form as the S.-American *B. proteus*, Broderip, and have somewhat similar granular sculpture.

Hab. Sugarloaf Ridge and Quarry, and the Barn (*Turton*). Extinct (? living).

(Section — ?)

17. *BULIMULUS SUBTRUNCATUS*, sp. nov. (Plate XXII. fig. 14.)

Testa subfossilis, elongato-ovata, superne acuminata, imperforata, lineis incrementi obliquis tenuibus striata; anfractus 7, convexiusculi, sutura subprofunda sejuncti, ultimus oblique declivis, sed prope labrum leviter ascendens, apertura inverse auriformis, longit. totius $\frac{1}{2}$ haud æquans; labrum tenue, antice leviter patulum vel expansum; columella obliqua, rectiuscula, callo tenui superne labro juncto induta, antice plus minus subtruncata.

Longit. $31\frac{1}{2}$ millim., *diam.* $12\frac{1}{2}$; *apertura* 14 longa, 7 lata.

Hab. Side Path, common (*Turton*). Extinct.

Although not particularly like *B. virgulatus*, Fér., it is perhaps more allied to that species than any other. The subtruncation of the columella, however, is more pronounced.

(PERONÆUS ?)

18. *BULIMULUS SUBPLICATUS* (Sowerby). (Plate XXII. fig. 15.)

Hab. Sugarloaf Ridge, common (*Turton*). Extinct.

Quite distinct from any other known species and of elongate form like the section *Peronæus*. The *Cochlicopa terebellum* of Sowerby, a slightly more slender form, is evidently merely a slight variety in which the plications at the suture, probably through the worn condition of the specimens, appear to be less developed.

(Section — ?)

19. *BULIMULUS EXULATUS* (Benson). (Plate XXII. fig. 16.)

Hab. Sugarloaf Ridge, common (*Turton*). Extinct.

Remarkable for the distinct truncation of the collumella like *Leptachatina*.

(Section — ?)

20. *BULIMULUS TURTONI*, sp. nov. (Plate XXII. figs. 17, 17 a.)

Testa anguste perforata, ovato-conica, tenuissima, nitida, fusco-cornea, strigis irregularibus opaco-lacteis, longitudinaliter picta; anfractus 7, convexiusculi, lineis incrementi obliquis striati, ultimus ad peripheriam rotundatus, in exemplis juvenilibus obsolete angulatus; apex subpapillaris; apertura ovata, superne acuminata, longit. totius $\frac{1}{2}$ haud æquans;